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GB

INNOVA 914S/929S

User Manual

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Thank you for choosing a INNOVA 914S/929S controller.

Please make sure that you have received the correct version of the controller.

The difference between the two controllers are only the supported I/O. Please look at the illustration below.

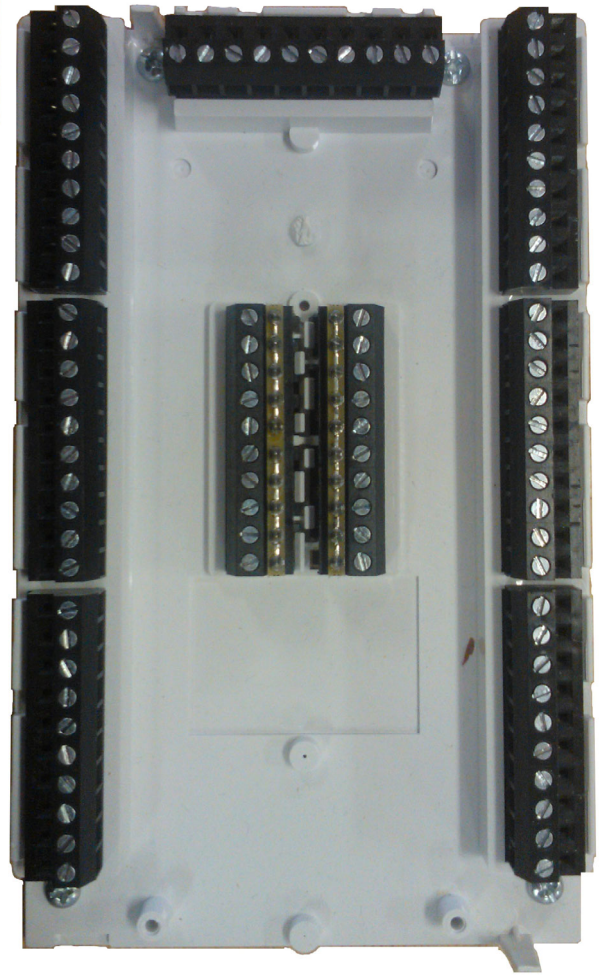
The controller is scheme-based. This means that the installer chooses a suitable control scheme from many different schemes that are already installed on the controller.

Once a scheme has been selected it can be customized. Please see the description of the different schemes later in this manual.
On the next pages in this manual you will be guided through the physical installation and maneuvering the single button user interface.

Technical data			
Power supply:	24 or 240 VAC 6W	**Digital output**	INNOVA914S: 2, INNOVA929S: 11 Solid state 240V/1A must be protected aginst inductive loads
Temperature area	Storage -20 °C to +70 °C Operational -10°C to +60°C	**Analog output**	INNOVA914S: 2, INNOVA929S: 4 Port 1..4: 0/2-10VDC Port 3,4:, 0/4..20mA
Humidity	Max. 90% RH, non condensating	**Analog input**	INNOVA914S:8, INNOVA929: 10 Port 1..10: 0-1450 ohm (PT1000) Port 1,3,5,7,9,10: 0/2-10V Port 9,10:0/4-20 mA DC Port 9,10:0..44900 ohm (NTC)
Mechanical	ABS/PC, IP20 115 x 185 x 54 mm 570 g	**Communication**	10/100 Mbit ethernet USB-Host or USB-Device Optional internal module: KNX, LON. M-Bus or RS485
Real time clock	± 12 minutes pr. year at 20°C. RTC can run for more than 1 year without power supply. Can be updated via SCADA or an internet connection	**Digital input**	4 Potential free contacts or max. 12 VDC
User interface	3.5” colorscreen Two-way scroll wheel with push-button select		

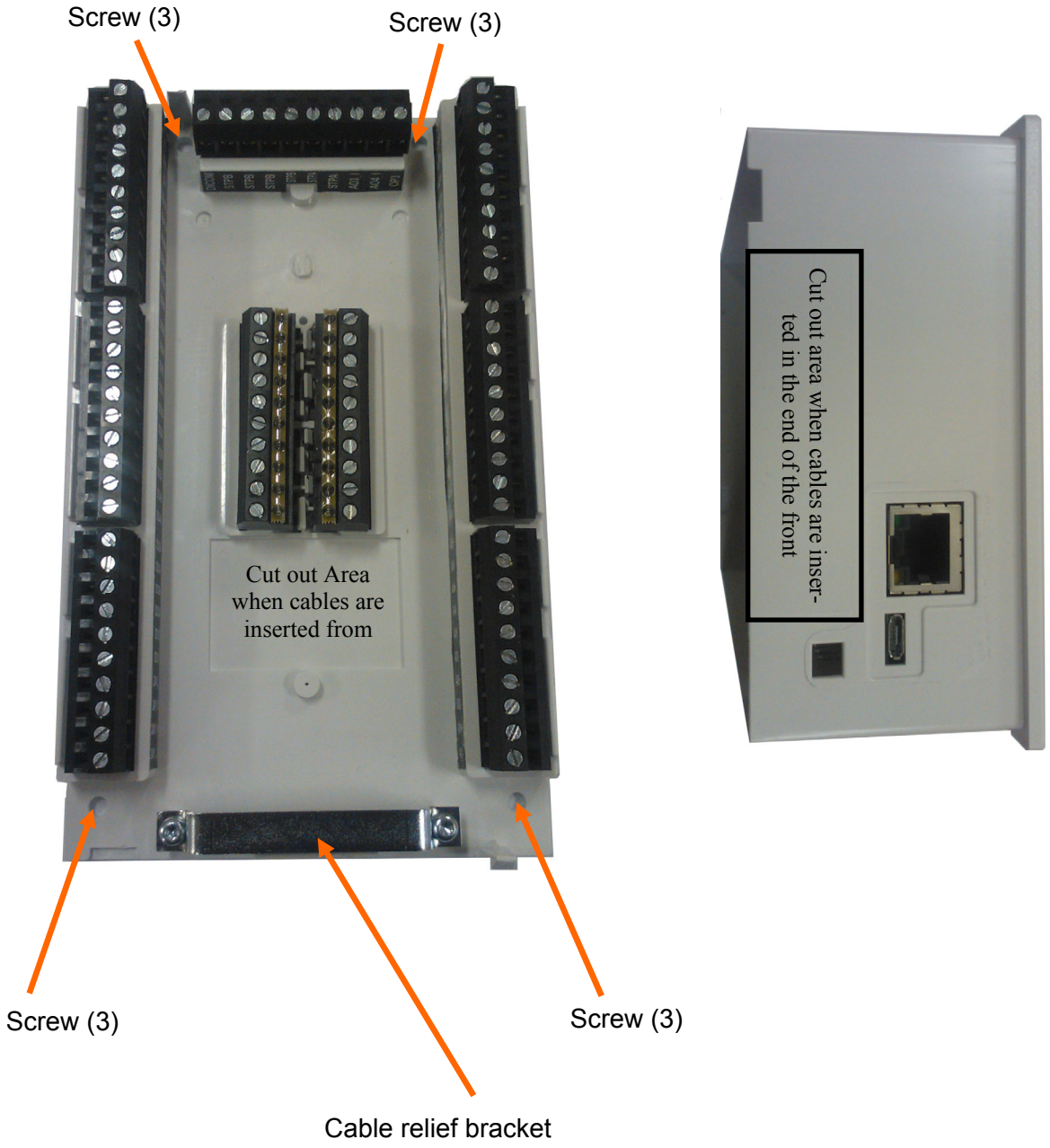
Included materials:

1. Product socket (rear part)
2. Product front
3. 4 pcs. of 3.9mm x 32 mm screws for wall mount
4. Cable relief bracket for cable retainance at socket
5. 2 pcs. of 3.0mm x 8 mm screws for cable relief bracket mounting



Product mount:

The socket (1) is to be wall mounted using the 4 screws (3). Cable insertion may be done from behind into the socket or from the connector end of the front

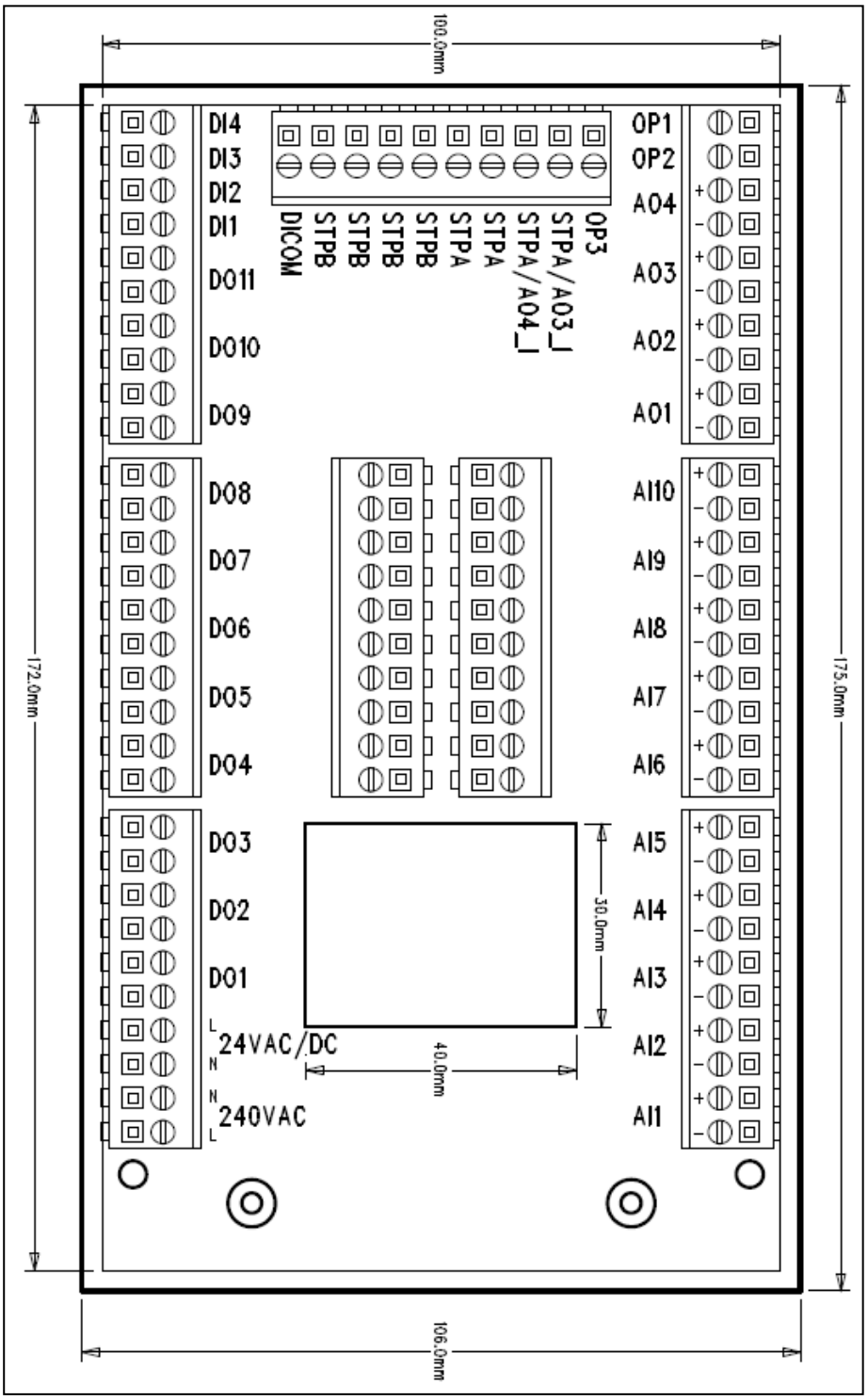

Screw (3)
Screw (3)
Cut out Area when cables are inserted from
Cut out area when cables are inserted in the end of the front
Screw (3)
Screw (3)
Cable relief bracket

Use a sharp knife to cut the plastic along or within the lines of the markings. When cutout is made in the connector end of the front, cables are inserted here and may be retained in the socket using the cable relief bracket.

Control scheme Installation:

Generic socket connection is based on below pin definitions for the socket.

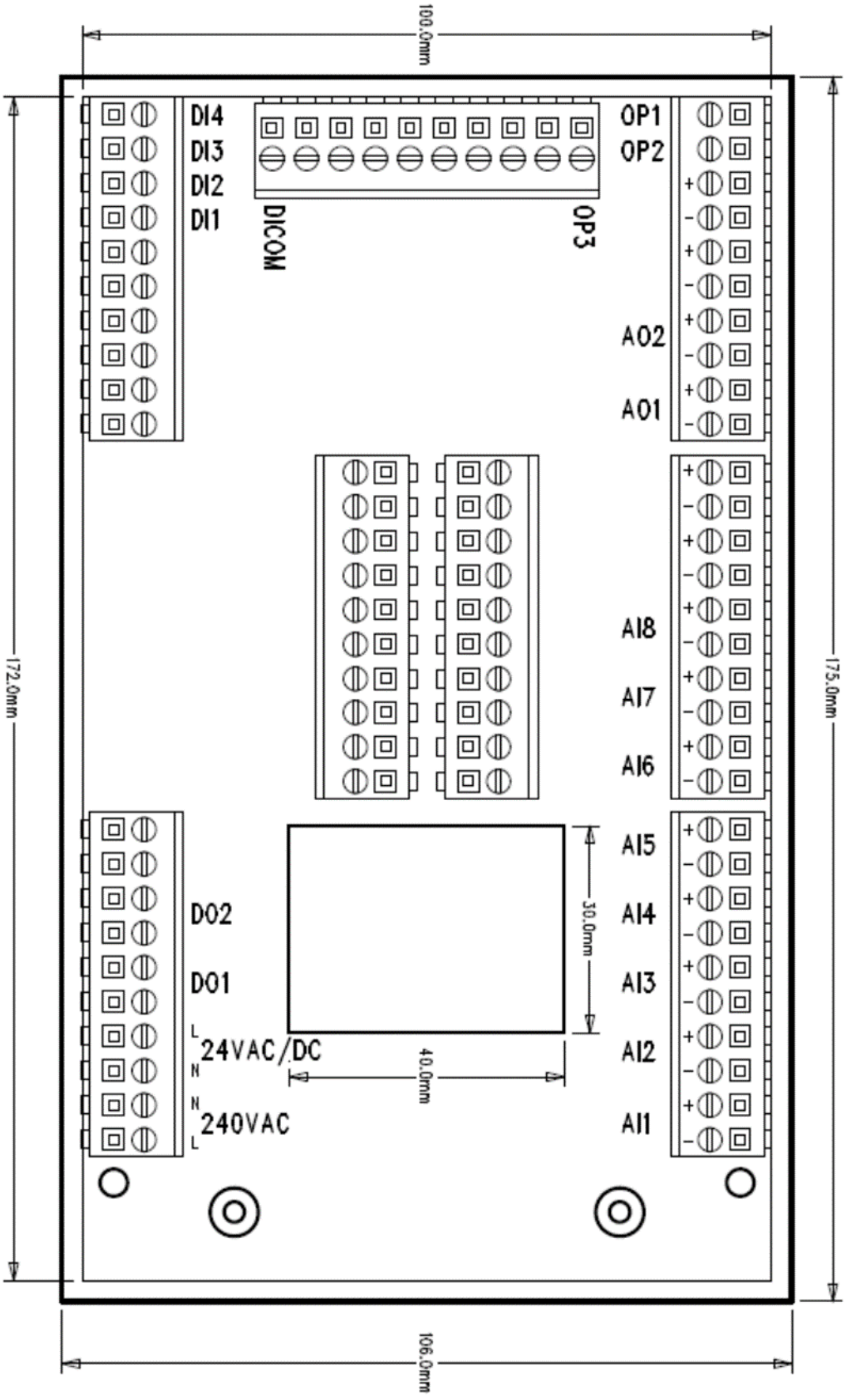
This depicts a fully mounted Innova controller. Please note that the variant you have bought may have reduced I/O functionality.



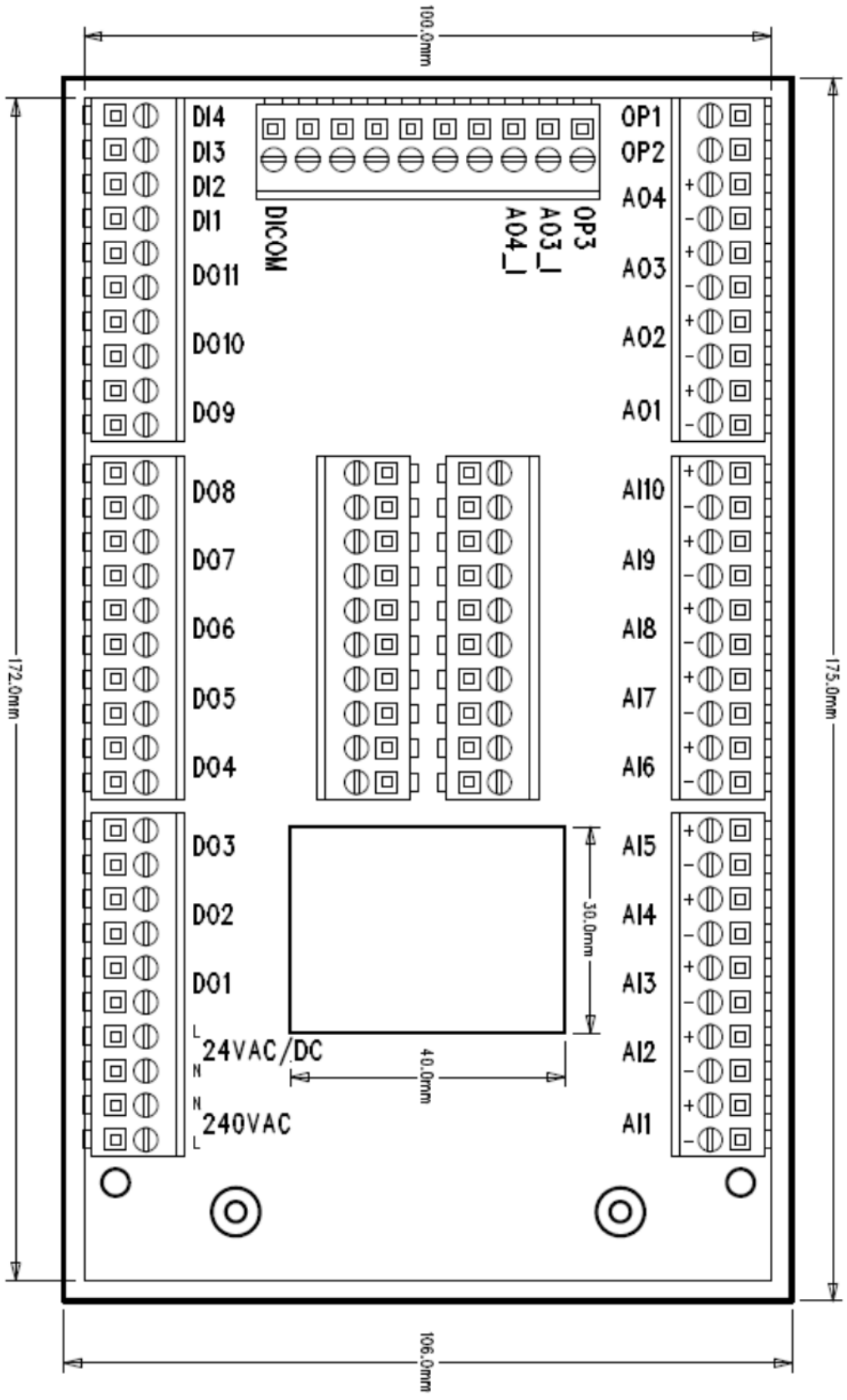
Terminal prefix is defined as:

Prefix	Definition	Comments
240VAC	2 terminals, N = Nul and L = Line for a 100V-240V AC power connection, 50Hz or 60Hz	Power may be substituted by 24V power
24VAC/DC	2 terminals, N = Nul/- and L = Line/+, 24V AC or DC is applicable, minimum 10W	When connected, 240VAC is disconnected in the controller internally. 24VAC must be used when the product is mounted with a M-Bus module
DOX (1-11)	2 terminals per I/O, Electronic relay. No polarization required.	AC or DC maximum 240VAC @ 1A maximum 400VDC @ 1A 3750V Rms isolation
DIX (1-4) DICOM	Potential free digital inputs with one common (DICOM) terminal to be used in relation with each DIX pin.	DICOM is a 5V DC potential sourcing maximum 50mA out. Protected against voltage inputs up to +75V peak. AC voltage protection only by resistive fuse.
STPB	4 terminals for Stepper motor connection, maximum 4W drive capability. Up to 24V drive.	24VAC/DC power required for extended drive capability
STPA	Secondary stepper motor connection as above	2 terminals combined with AO current output capability. Not coexisting, i.e. controller mounted with either AO current output or second stepper motor capability
OPTX (1-3)	3 terminals for communication module support	Module must be mounted from factory M-BUS RS485 KNX LON
AOX (1-4)	2 terminals for each output, polarization as + and – indicates. 0-10V, 10mA drive capability. Current loop output on AO3 and 4 on secondary terminals as described for STPA terminals	When using current mode the – terminal is still to be used at the primary terminal block. Protected against reverse polarity and input voltages up to 60V
AIX (1-10)	2 terminals for each I/O. Requires polarization as indicated by + and -. Capability per I/O number: Port 1..10: 0-1450 ohm (PT1000) Port 1,3,5,7,9,10: 0/2-10V Port 9,10:0/4-20 mA DC Port 9,10:0..44900 ohm (NTC)	Protected against reverse polarity and input voltages up to 60V

INNOVA 914S configuration:



INNOVA 929S configuration:

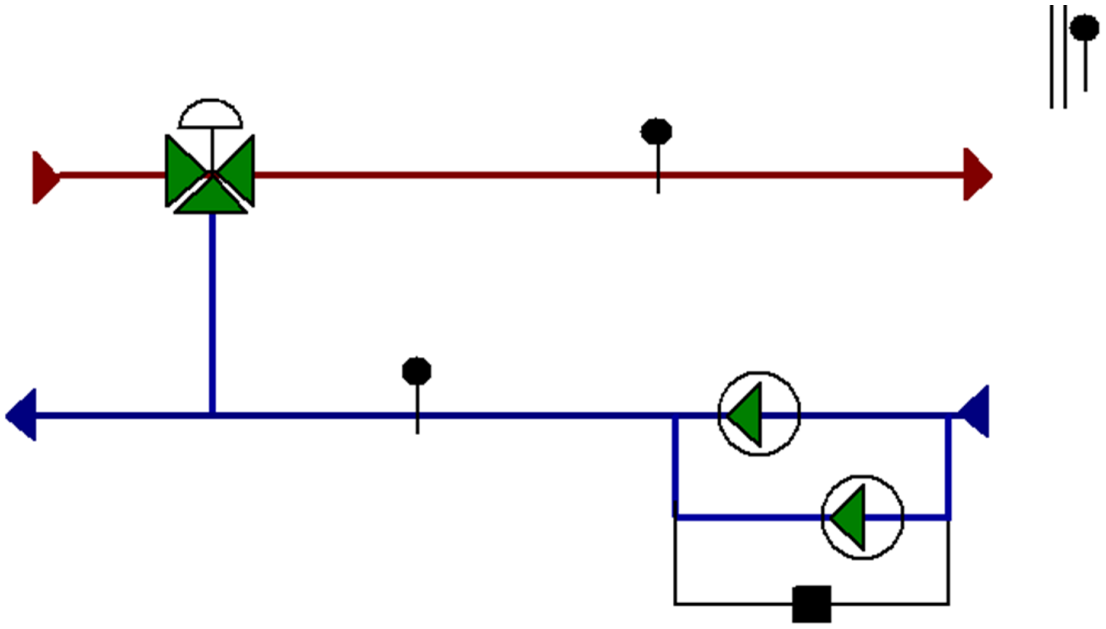


Schemes:

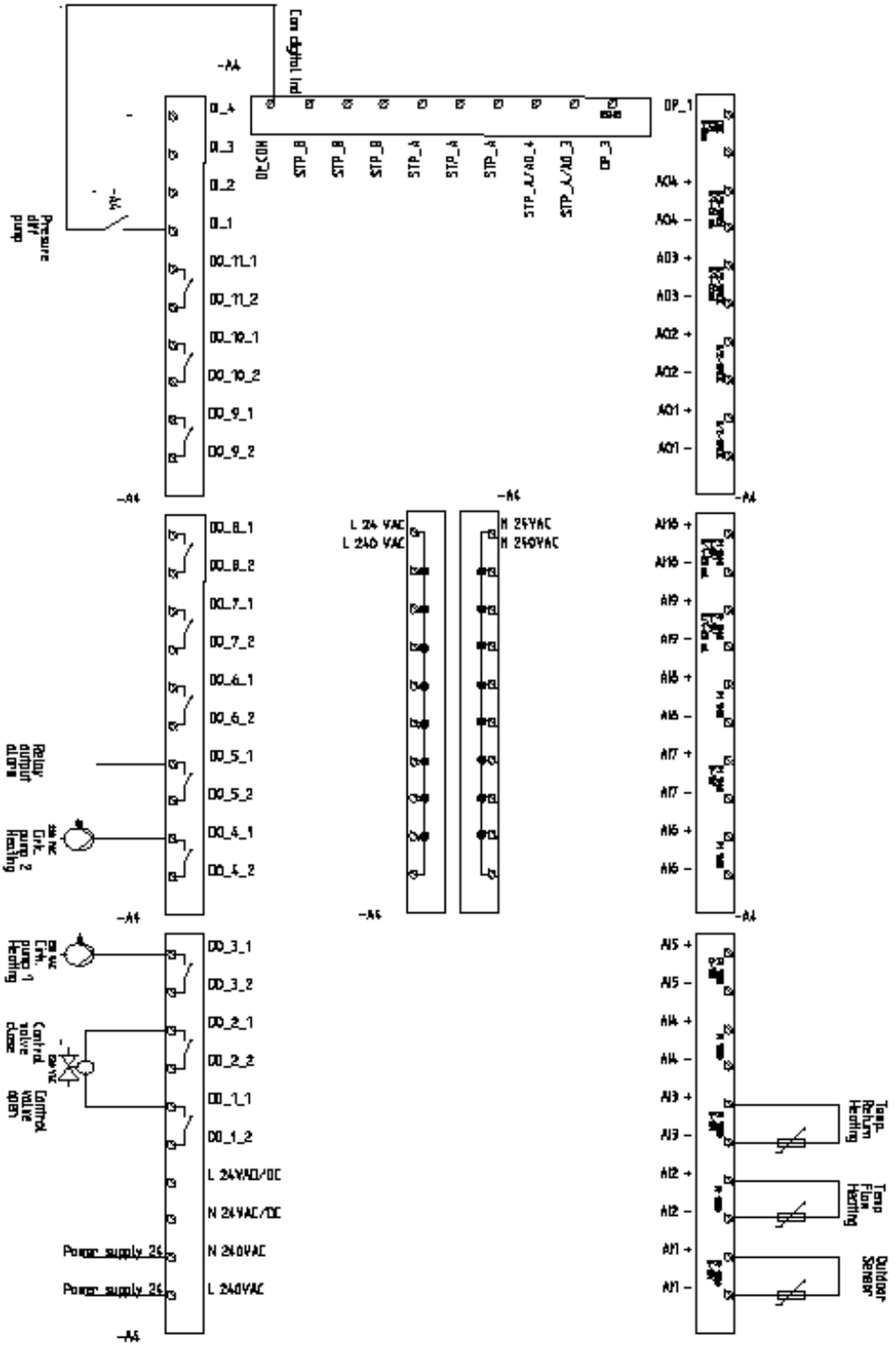
For a scheme selected there will be a physical diagram, a wiring diagram and a description associated. The following list of schemes are currently available:

1. Central Heating
2. Central Heating with heat exchanger
3. Dual Central Heating with heat exchanger
4. Tripple Central Heating with heat exchanger
5. Central heating with heat exchanger and Hotwater heater

Scheme 1 Regulation circuit:



Scheme 1 Wiring diagram:



Scheme 1 Description:

Central heating control

The control topology for central heating is a mixing loop with outdoor temperature compensation of incoming flow temperature.

. Regulation:

The incoming flow temperature is controlled by the motor valve. Regulation is from 0 – 100%.
The incoming flow temperature is then regulated in relation to the outdoor temperature, also called climate compensation, defined as follows.

Above 19°C (default – may be changed), the circulation pump is stopped. With a linear relation, two set points then defines the compensation formula
-12°C outdoor temperature = 70°C incoming flow temperature
18°C outdoor temperature = 35°C incoming flow temperature
These are default values that may be changed

. Pump:

The 2 circulation pumps will in shift be used according to a time schedule. One pump is primary and the other acts as a redundant function.
In case of an error (no differential pressure) for a pump, the other will take over. An alarm will be generated and the failing pump must be inspected and repaired.
The differential pressure fault state must be reset for the regulator to return to normal state.

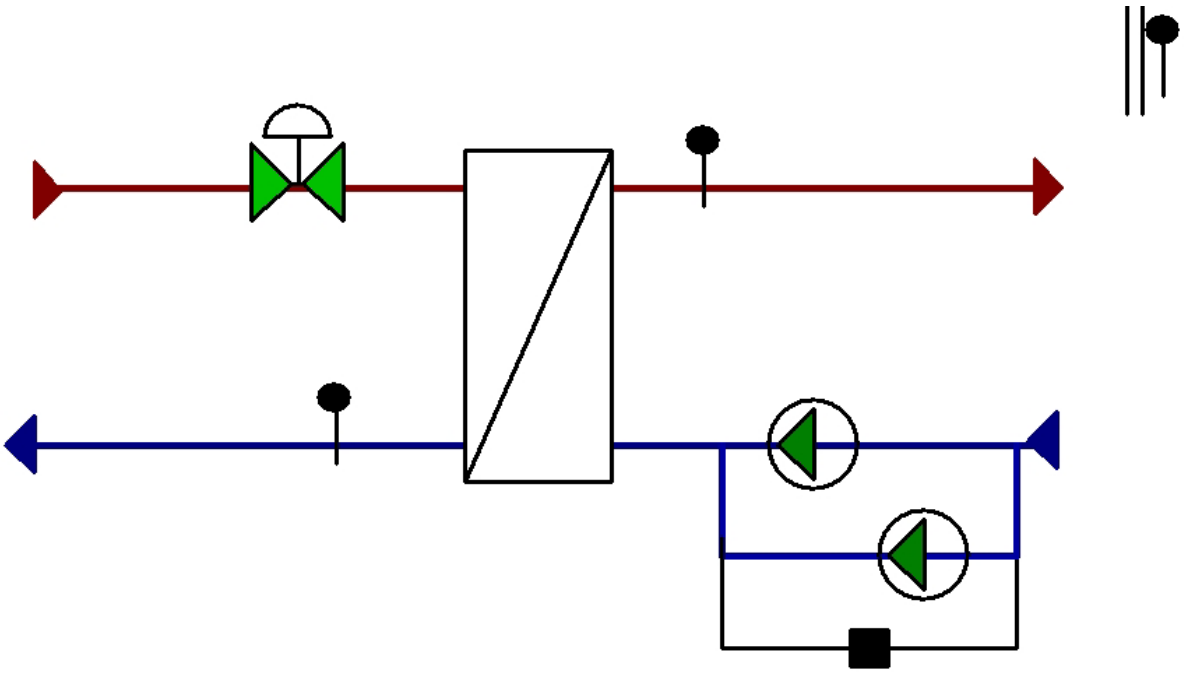
. Default activation:

The circulation pump is activated once every 24 hours if no other regulation is detected.
The valve for regulation is likewise activated once every 24 hours if no other regulation is detected.

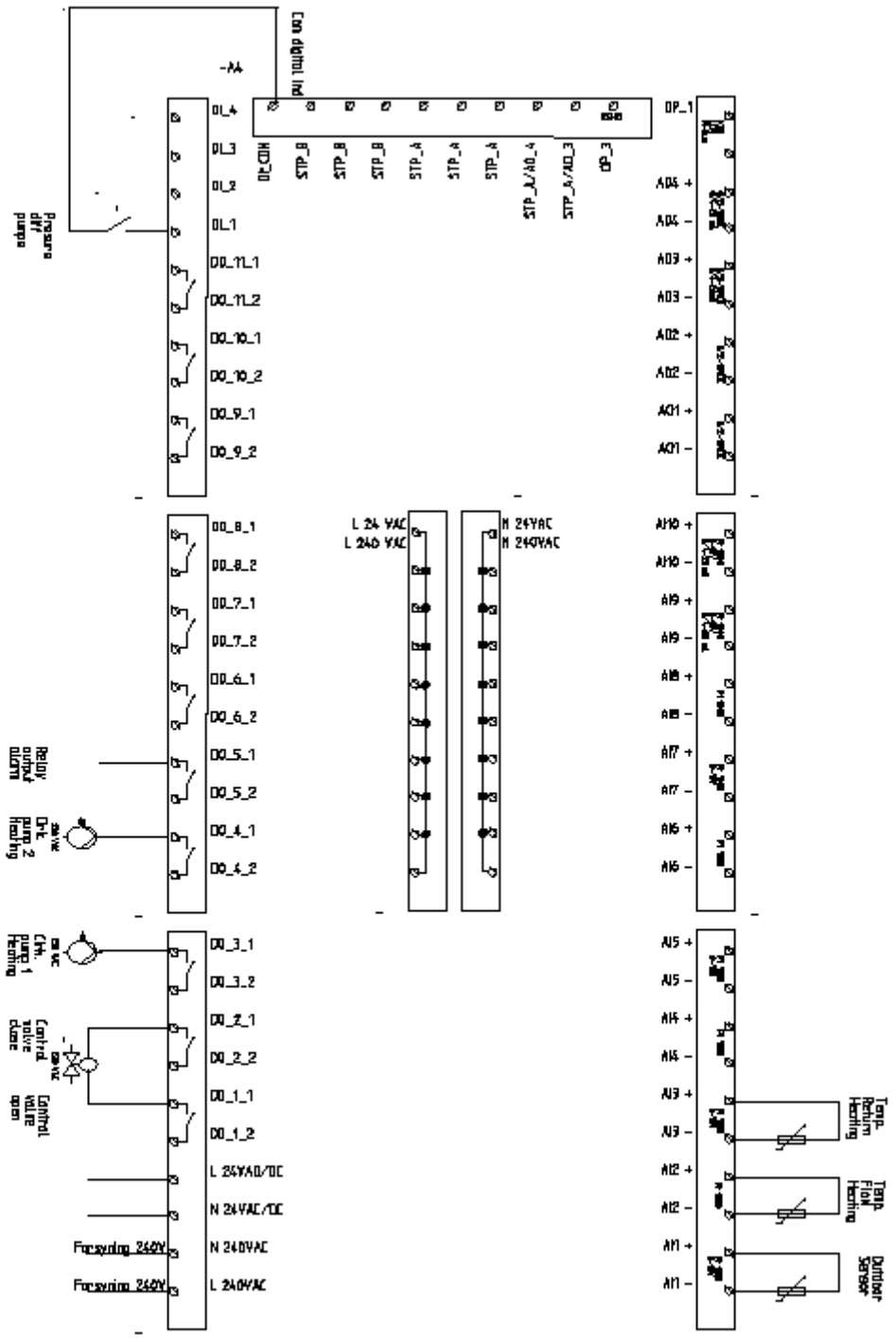
. Alarm out:

Alarm output is activated if:
The current incoming flow temperature is different from the one set by the regulation formula.
Differential pressure over the pump is less than the value set by the sensor.

Scheme 2 Regulation circuit:



Scheme 2 Wiring diagram:



Scheme 2 Description:

Central heating control
The control topology for central heating is a mixing loop with outdoor temperature compensation of incoming flow temperature.

. Regulation:
The incoming flow temperature is controlled by the motor valve. Regulation is from 0 – 100%.
The incoming flow temperature is then regulated in relation to the outdoor temperature, also called climate compensation, defined as follows.

Above 19°C (default – may be changed), the circulation pump is stopped. With a linear relation, two set points then defines the compensation formula
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These are default values that may be changed

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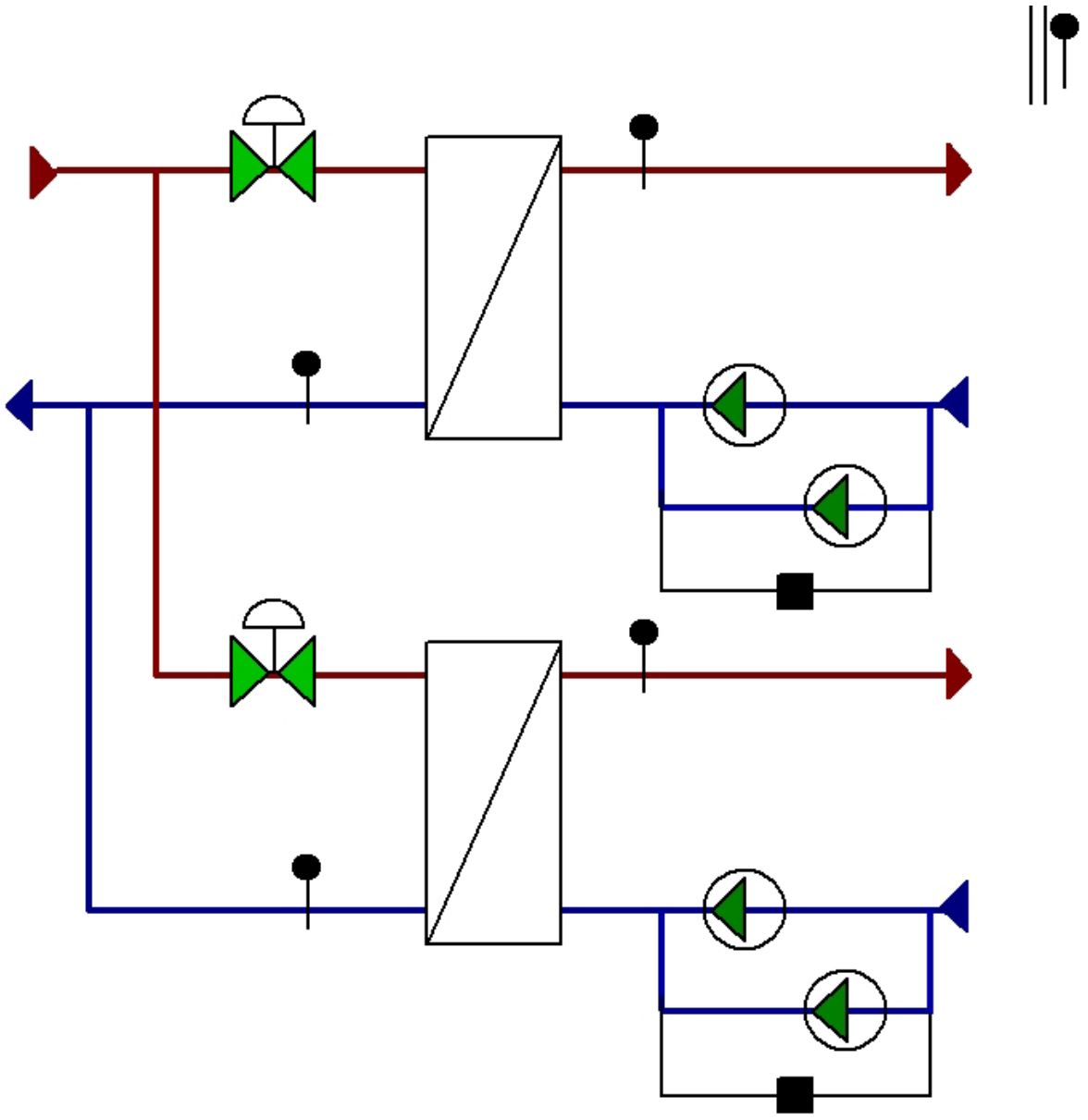
In case of an error (no differential pressure) for a pump, the other will take over. An alarm will be generated and the failing pump must be inspected and repaired.
The differential pressure fault state must be reset for the regulator to return to normal state.

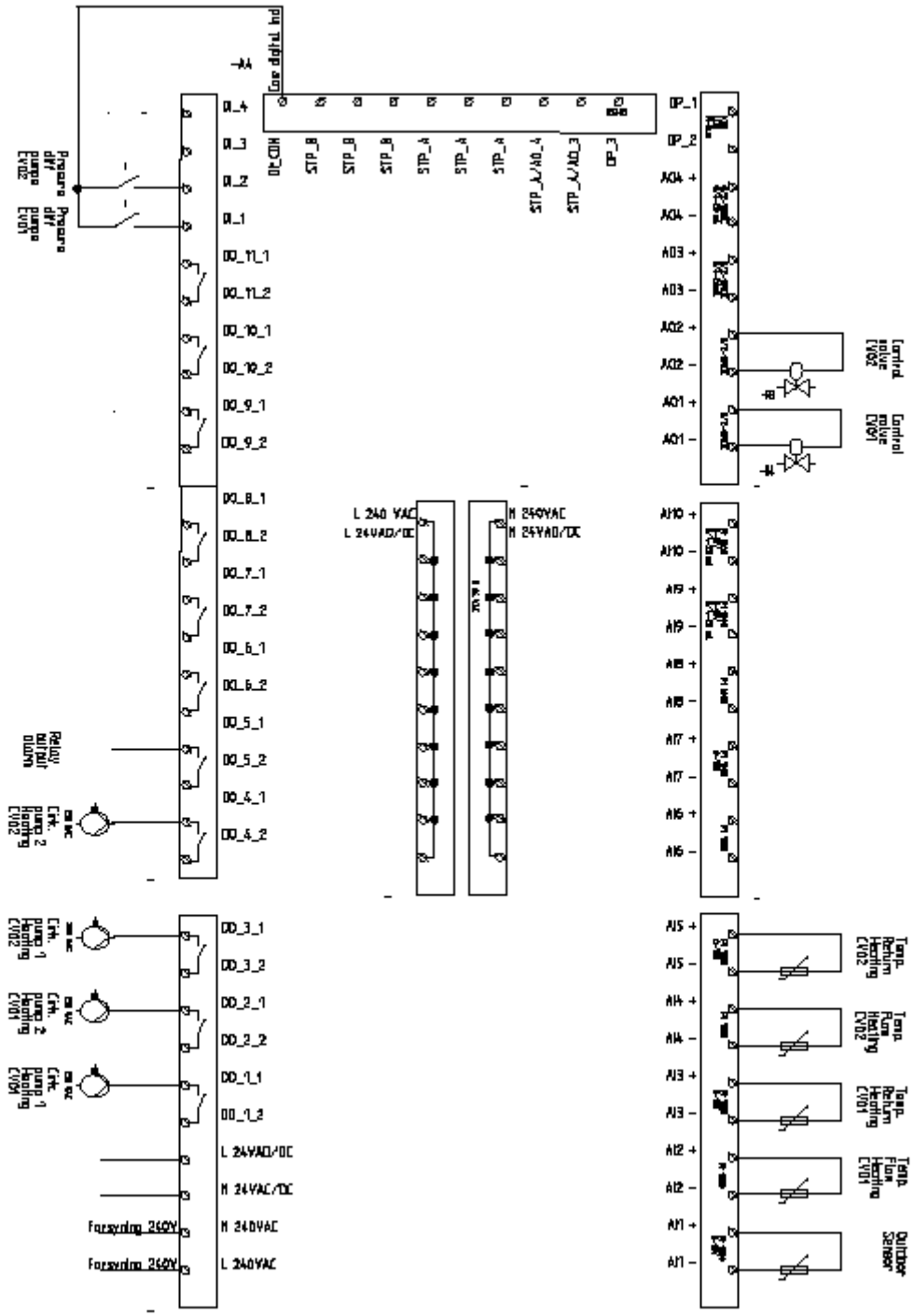
. Default activation:
The circulation pump is activated once every 24 hours if no other regulation is detected.
The valve for regulation is likewise activated once every 24 hours if no other regulation is detected.

. Alarm out:
Alarm output is activated if:
The current incoming flow temperature is different from the one set by the regulation formula.
Differential pressure over the pump is less than the value set by the sensor.
Water fill on secondary, do not reach pressure to this minimum value within a given preset time.

Scheme 3 Regulation circuit:



Scheme 3 Wiring diagram:



Scheme 3 Description:

Central heating control
The control topology for central heating is a mixing loop with outdoor temperature compensation of incoming flow temperature.

. Regulation:
The incoming flow temperature is controlled by the motor valve. Regulation is from 0 – 100%.
The incoming flow temperature is then regulated in relation to the outdoor temperature, also called climate compensation, defined as follows.

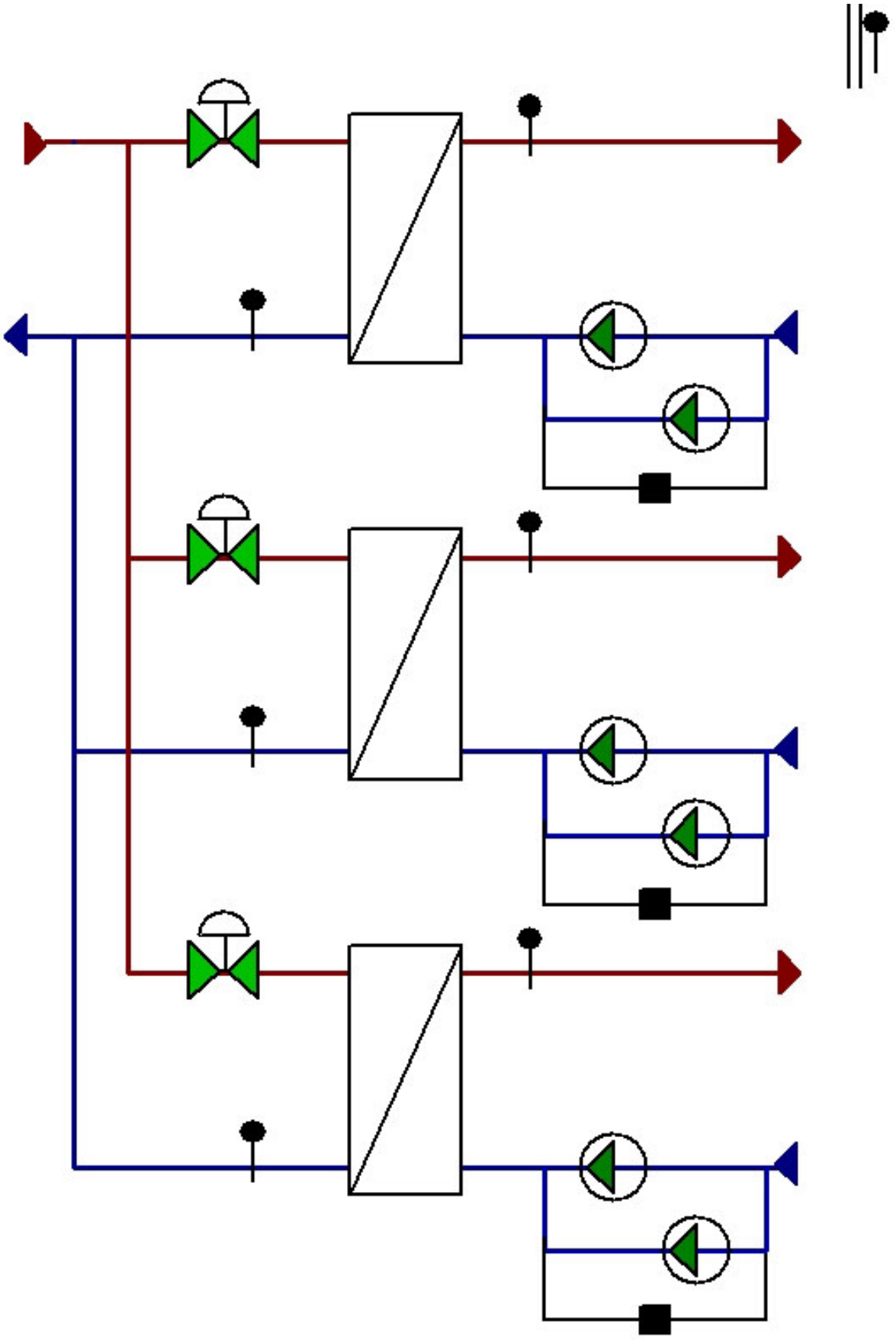
Above 19°C (default – may be changed), the circulation pump is stopped. With a linear relation, two set points then defines the compensation formula
-12°C outdoor temperature = 70°C incoming flow temperature
18°C outdoor temperature = 35°C incoming flow temperature
These are default values that may be changed

. Pump:
The 2 circulation pumps will in shift be used according to a time schedule. One pump is primary and the other acts as a redundant function.
In case of an error (no differential pressure) for a pump, the other will take over. An alarm will be generated and the failing pump must be inspected and repaired.
The differential pressure fault state must be reset for the regulator to return to normal state.

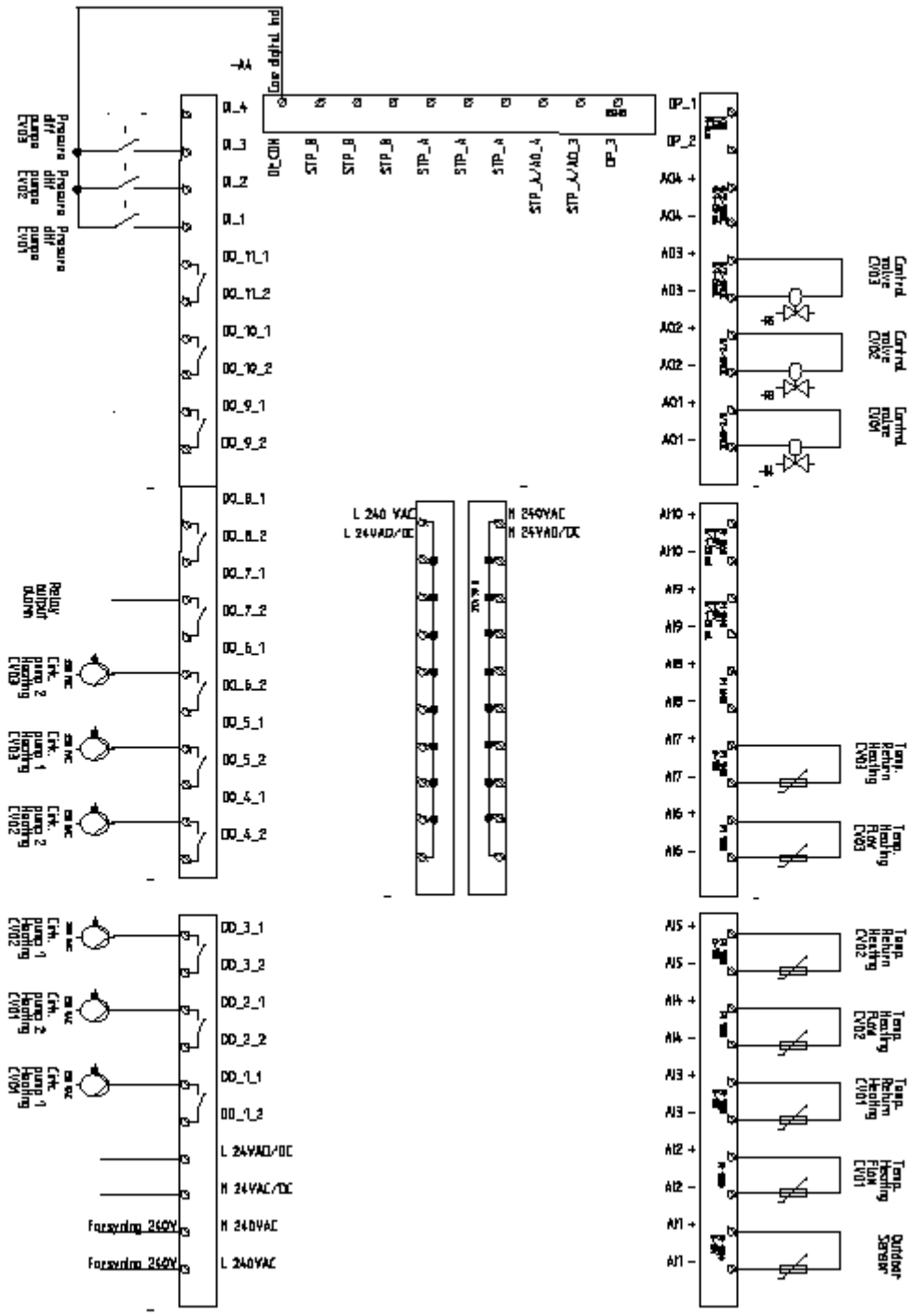
. Default activation:
The circulation pump is activated once every 24 hours if no other regulation is detected.
The valve for regulation is likewise activated once every 24 hours if no other regulation is detected.

. Alarm out:
Alarm output is activated if:
The current incoming flow temperature is different from the one set by the regulation formula.
Differential pressure over the pump is less than the value set by the sensor.
Water fill on secondary, do not reach pressure to this minimum value within a given preset time.

Scheme 4 Regulation circuit:



Scheme 4 Wiring diagram:



Scheme 4 Description:

Central heating control
The control topology for central heating is a mixing loop with outdoor temperature compensation of incoming flow temperature.

. Regulation:
The incoming flow temperature is controlled by the motor valve. Regulation is from 0 – 100%.
The incoming flow temperature is then regulated in relation to the outdoor temperature, also called climate compensation, defined as follows.

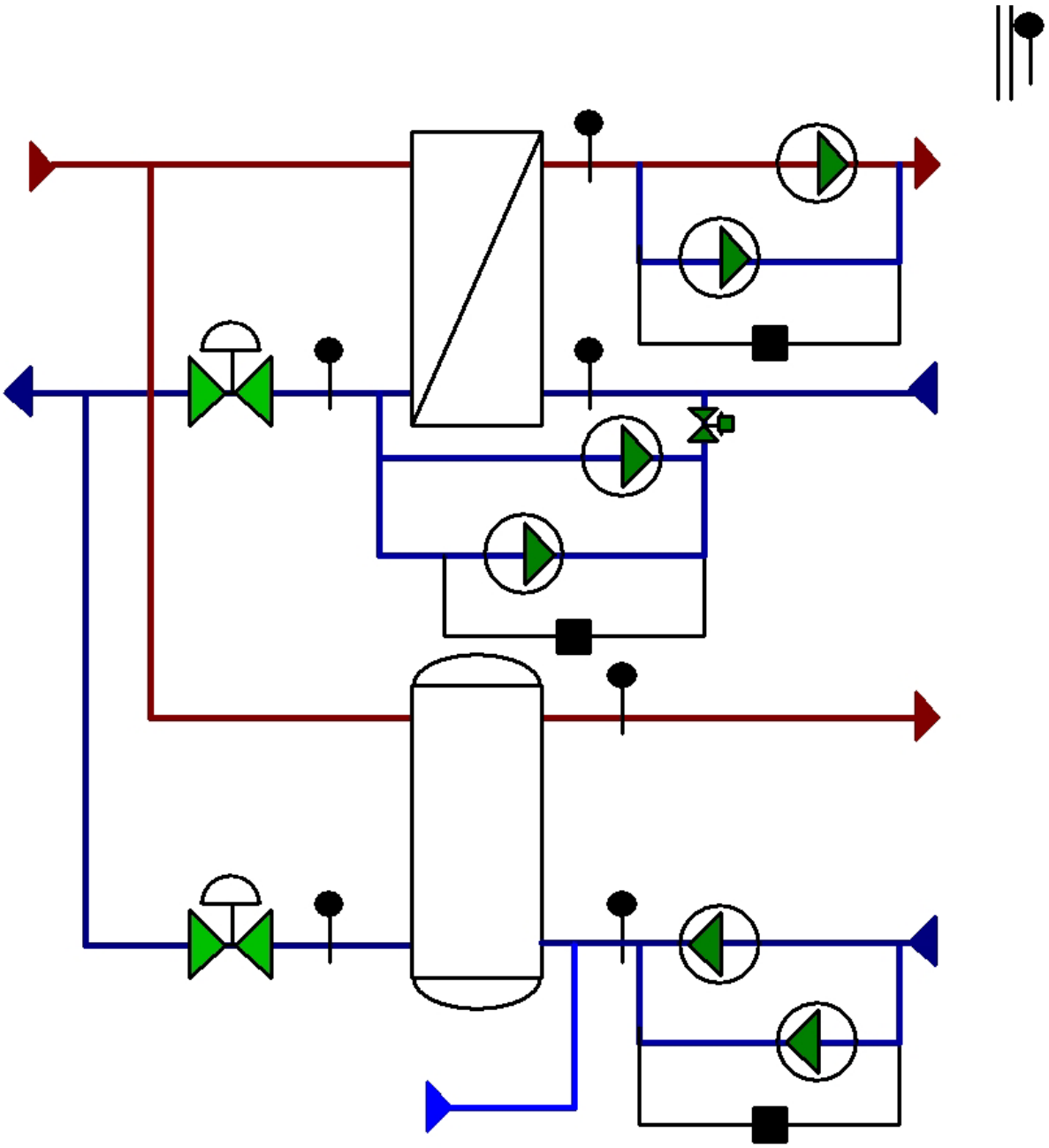
Above 19°C (default – may be changed), the circulation pump is stopped. With a linear relation, two set points then defines the compensation formula
-12°C outdoor temperature = 70°C incoming flow temperature
18°C outdoor temperature = 35°C incoming flow temperature
These are default values that may be changed

. Pump:
The 2 circulation pumps will in shift be used according to a time schedule. One pump is primary and the other acts as a redundant function.
In case of an error (no differential pressure) for a pump, the other will take over. An alarm will be generated and the failing pump must be inspected and repaired.
The differential pressure fault state must be reset for the regulator to return to normal state.

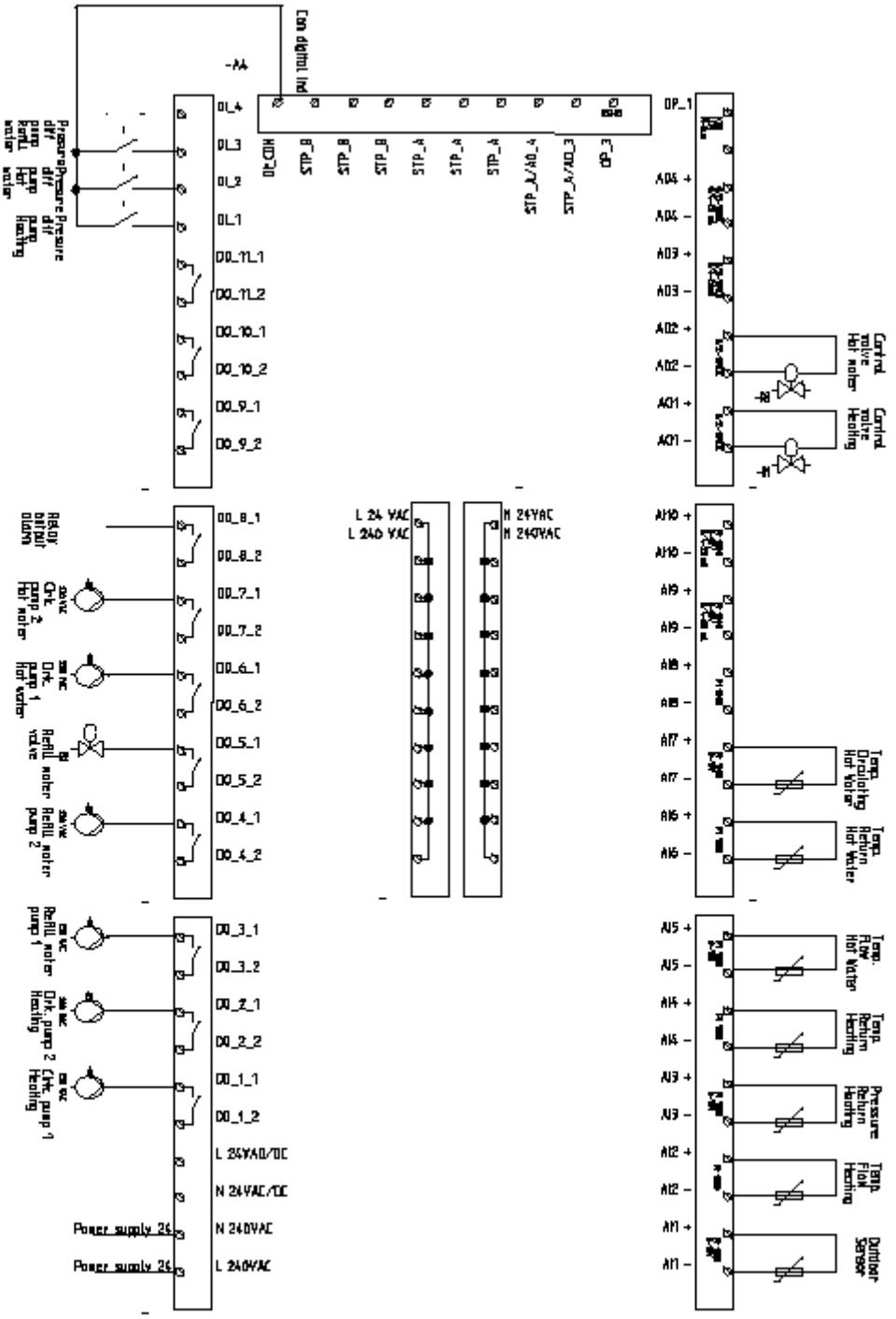
. Default activation:
The circulation pump is activated once every 24 hours if no other regulation is detected.
The valve for regulation is likewise activated once every 24 hours if no other regulation is detected.

. Alarm out:
Alarm output is activated if:
The current incoming flow temperature is different from the one set by the regulation formula.
Differential pressure over the pump is less than the value set by the sensor.
Water fill on secondary, do not reach pressure to this minimum value within a given preset time.

Scheme 5 Regulation circuit:



Scheme 5 Wiring diagram:



Scheme 5 Description:

Central heating control

The control topology for central heating is a mixing loop with outdoor temperature compensation of incoming flow temperature.

. Regulation:

The incoming flow temperature is controlled by the motor valve. Regulation is from 0 – 100%.
The incoming flow temperature is then regulated in relation to the outdoor temperature, also called climate compensation, defined as follows.

Above 19°C (default – may be changed), the circulation pump is stopped. With a linear relation, two set points then defines the compensation formula
-12°C outdoor temperature = 70°C incoming flow temperature
18°C outdoor temperature = 35°C incoming flow temperature
These are default values that may be changed

. Pump:

The 2 circulation pumps will in shift be used according to a time schedule. One pump is primary and the other acts as a redundant function.
In case of an error (no differential pressure) for a pump, the other will take over. An alarm will be generated and the failing pump must be inspected and repaired.
The differential pressure fault state must be reset for the regulator to return to normal state.

. Default activation:

The circulation pump is activated once every 24 hours if no other regulation is detected.
The valve for regulation is likewise activated once every 24 hours if no other regulation is detected.

Hot water heater

Hot water supply is based on a Hot Water Tank.

. Regulation:

A temperature sensor in the Hot Water Tank is used to regulate the motor valve in the return line.
Regulation is from 0 – 100%.
The temperature set level at which regulation is active, may be changed.

. Circulation Pump:

The 2 circulation pumps will in shift be used according to a time schedule. One pump is primary and the other acts as a redundant function.
In case of an error (no differential pressure) for a pump, the other will take over. An alarm will be generated and the failing pump must be inspected and repaired.
The differential pressure fault state must be reset for the regulator to return to normal state.

. Water fill:

If the static pressure on secondary side is lower than a preset value, water must be supplied from primary side until pressure is reached or if a set time is exceeded.
The 2 pumps will in shift be used according to a time schedule. One pump is primary and the other acts as a redundant function.
In case of an error (no differential pressure) for a pump, the other will take over. An alarm will be generated and the failing pump must be inspected and repaired.
The differential pressure fault state must be reset for the regulator to return to normal state.

. Alarm out:

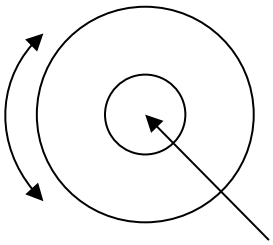
Alarm output is activated if:
The current incoming flow temperature is different from the one set by the regulation formula.
Differential pressure over the pump is less than the value set by the sensor.
Water fill on secondary, do not reach pressure to this minimum value within a given preset time.

Button operation:

To navigate the INNOVA 9xxS menus the intuitive scroll wheel with push button is used.

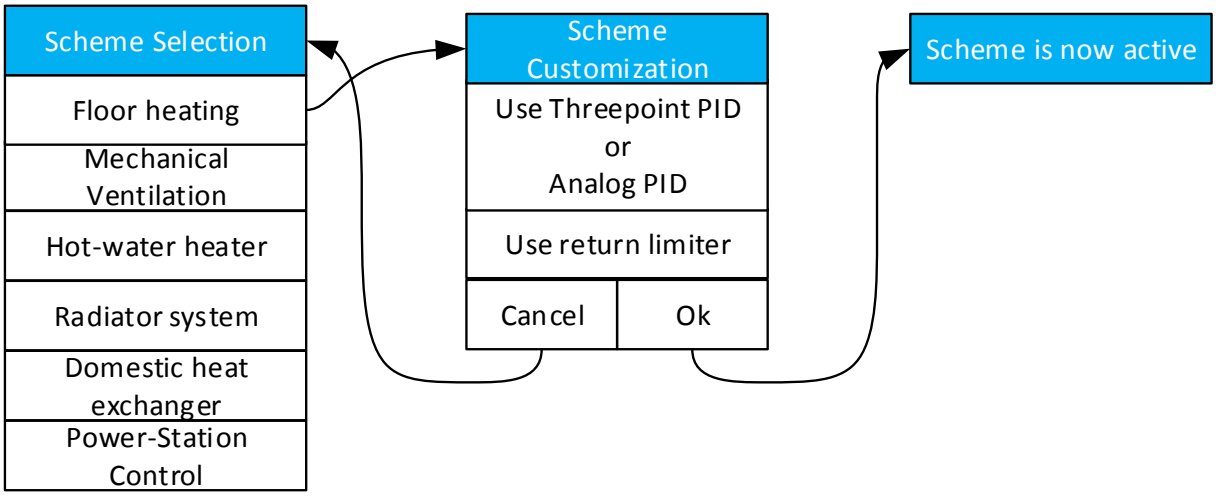
The scroll function is used to switch between items or to change a value. The Push button is used as an Ok/Cancel button. A short push equals 'Accept' and a long push (more than 1 second) equals 'Cancel'

When editing setpoints, timers etc. there is one more functional level. A short push enters the editing mode, two short pushes indicates that the editing is done. A long push cancels editing



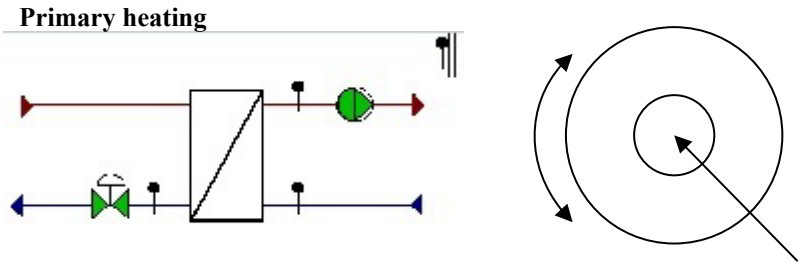
Scroll wheel with push button

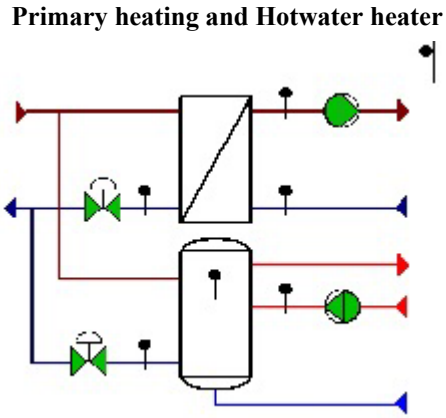
Controller setup in principle:

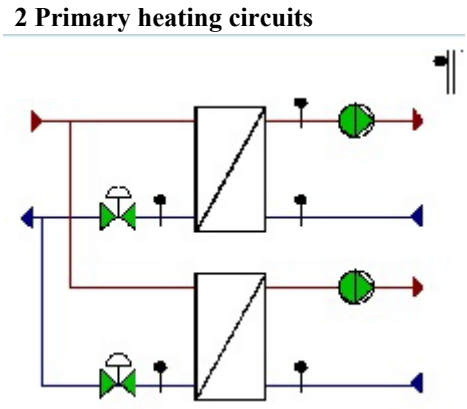


Scheme selection:

The screen shows the installed schemes and the scroll-wheel is used to scroll and select the scheme. Please note that the shemes are described in detail later in this manual. The schemes below are just for illustration



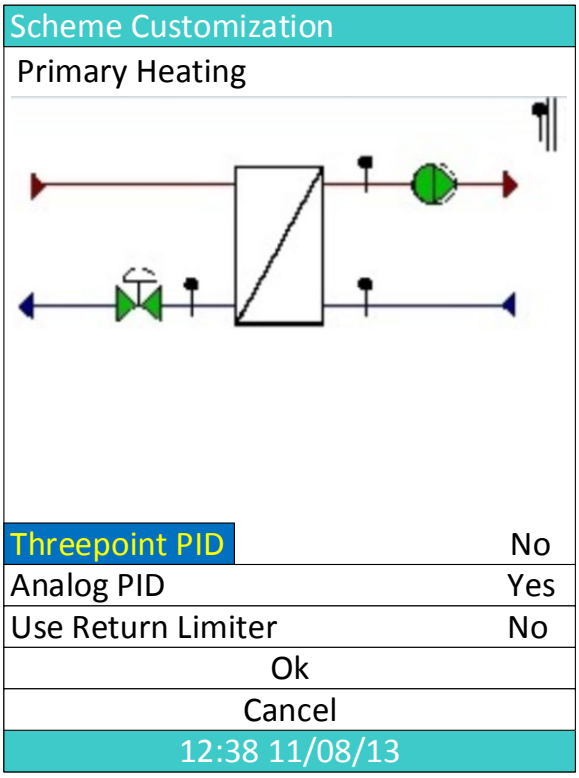


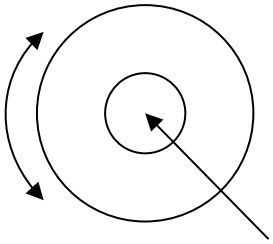


If we decide to select the first scheme, then the customization screen appears

Scheme customization:

The screen shows the name of the selected scheme, the customization choices for the scheme, in this case:

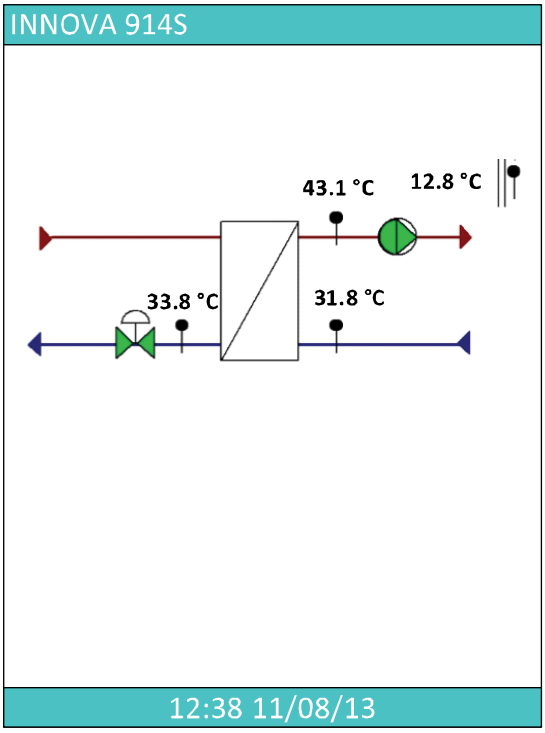


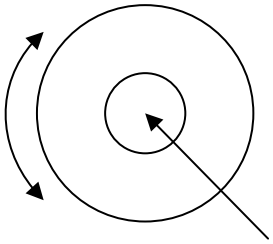


Make the desired changes if any and scroll to Ok and press the pushbutton. The controller will now start operating in regulation mode.

Regulation mode:

The screen shows a graphical representation of the active scheme. This also shows the currently measured values





The short push of the selection button will gain access to the menu for the active scheme as well as ‘Info’ and ‘Clock’. From the menu a long push will return to this overview

‘Info’ displays the current IP-address also the IP configuration can be accessed and changed here. This can be used to connect using a web browser on a PC or a mobile device application.

‘Clock’ is used to set current time and date also time zone information can be set here as well as the controller language.

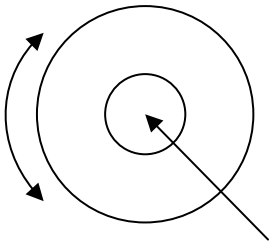
The menu displays all data for the active scheme. This includes timers, setpoints, actual values and other relevant information.

The various screens are shown in detail in the next paragraphs

Setup Screen:

This screen shows the components of the active scheme. The Lines ending with a '>' contains a submenu that can be selected. Navigation between the different menus is made with pushbutton control. A short push enters the menu, a long push leaves the menu.
'Return' returns to the Graphic overview

INNOVA 914S	
Central heating	
Switch	>
Actual	>
Var. settings	
Manual override	>
Timer	>
Summer/Winter state	>
Central heating	>
Forward temperature	>
Return limiter	>
Ramp	>
Valve	>
Pump	>
12:38 11/08/13	



As an example the Actual menu is shown below:

Centralheating/Actual	
Outside	12.8 °C
Forward	42.2 °C
Return	31.4 °C
Forward Ref.	42.0 °C
Return limit	51.4 °C
Valve	0 %
12:38 11/08/13	

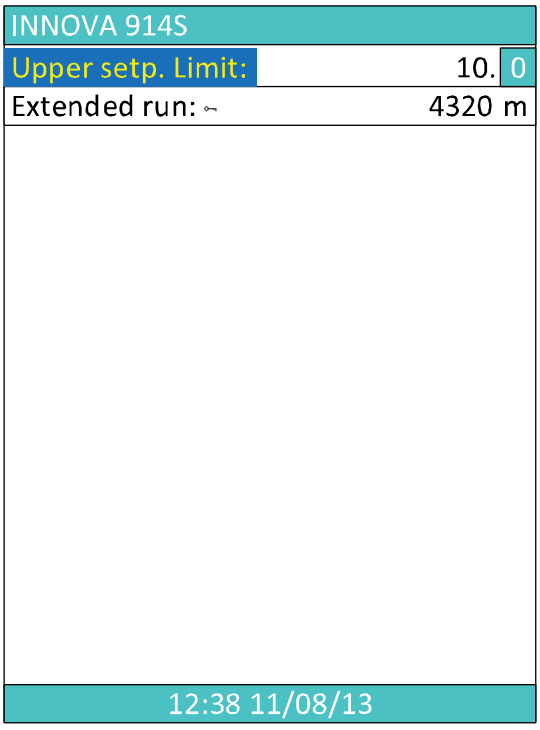
Setup Screen:

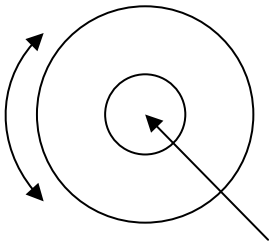
This screen below shows the ‘Manual Override’ menu where the user has selected to change the ‘Upper setp. Limit’.

To edit the value a line is selected by moving the scroll wheel, then the push-button is activated shortly and now the right most digit is selected. The scroll-wheel can now move the cursor to the desired position. A short activation of the push-button selects this digit for editing. This value can now be changed with the scroll-wheel and once desired value has been set press the push-button shortly again and a new digit can be selected again. Once satisfied the push-button is pressed shortly two times and the editing is done.

As shown below a key sign might be shown on each line. In that case a password must be entered, in the same manner as described above before editing is allowed.

The passwords are: ‘1111’, ’2222’, ’3333’ or ‘4444’ depending on the protection level. Once a password has been entered the password remain in effect for a 5 minute period before it’s necessary to enter the password again.

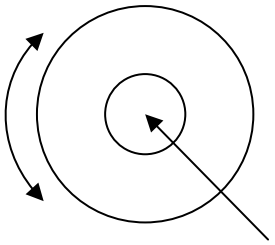




Info Screen:

This screen contains the TCPI/IP configuration and also shows the current IP address and MAC address. It's advisable to let the controller use DHCP as this makes sure that the setup is correct. If a fixed IP-address is needed, either to be able to access the controller from the internet or to be sure which address will be used is advisable to enter the controllers MAC number into the DHCP server. If access from the internet is needed the router/firewall solution used must open port 75 and port 80 from the internet using NAT and route these port to the controller.

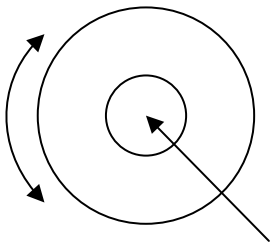
INNOVA 914S	
DHCP:	Active
Static TCP/IP setup:	
TCP/IP address:	192.168.1.251
TCP/IP netmask:	255.255.255.0
TCP/IP gateway:	192.168.1.1
DNS server:	192.168.1.1
Current TCP/IP address:	
TCP/IP address:	192.168.1.251
TCP/IP netmask:	255.255.255.0
TCP/IP gateway:	192.168.1.1
DNS server:	192.168.1.1
MAC address:	00:12:3B:90:00:01
12:38 11/08/13	



Clock Screen:

This screen allows setting of the current time and also the GMT offset and use of daylight savings time.

INNOVA 914S	
Current time:	11:38 11/8/13
Time setup:	
GMT Offset:	-1
DST Active:	Yes
Date format:	DD/MM/YY
Language:	en
12:38 11/08/13	



Accessing the controller from the web

When accessing the controller from the web the IP-Address of the controller must be known. The info screen mentioned in an earlier section of this manual must be used for this purpose. Please see illustration below

A standard web browser can be used, also Java must be installed on the target PC. The supported operating systems on the PC can either be Windows, Linux or Mac.

INNOVA 914S	
DHCP:	Active
Static TCP/IP setup:	
TCP/IP address:	192.168.1.251
TCP/IP netmask:	255.255.255.0
TCP/IP gateway:	192.168.1.1
DNS server:	192.168.1.1
Current TCP/IP address:	
TCP/IP address:	192.168.1.251
TCP/IP netmask:	255.255.255.0
TCP/IP gateway:	192.168.1.1
DNS server:	192.168.1.1
MAC address:	00:12:3B:90:00:01
12:38 11/08/13	

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